Enterprise Strategy Group™
by TechTarget

HPE GreenLake for Block Storage Built on HPE Alletra Storage MP

Breaking the Traditional Paradigm of Configuring and Managing Storage in the Data Center

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Introduction

This Technical Validation from TechTarget's Enterprise Strategy Group documents our evaluation of HPE GreenLake for Block Storage built on HPE Alletra Storage MP. We specifically reviewed how this storage platform can help organizations simplify operations and management, deliver better price performance, and scale efficiently to support performance and capacity requirements across multiple workloads.
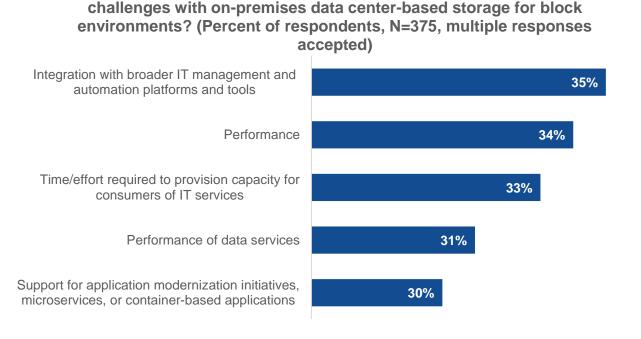
Background

According to research from Enterprise Strategy Group, one of the top five objectives for digital transformation initiatives is to develop data-centric products and services.[1] Developing such products and services requires organizations to deploy more applications that process higher volumes of data, particularly data analytics, artificial intelligence (AI), and machine learning (ML).

As more applications leverage more data, organizations must also be cognizant of the myriad of storage performance and capacity requirements to adequately support these diverse workloads. In fact, Enterprise Strategy Group research also found that 34% of organizations surveyed noted that storage performance for block environments was one of their top challenges (see Figure 1). The same research showed that the time and effort needed to provision capacity for consumers of IT services (cited by 33% of respondents) was also presenting challenges to organizations,[2] especially as organizations are expected to respond to business needs faster.

Figure 1. Top System-related Challenges With On-premises Data Center-based Block Storage

Which of the following, if any, are your organization's system-related challenges with on-premises data center-based storage for block environments? (Percent of respondents, N=375, multiple responses accepted)

Challenge	Percent
Integration with broader IT management and automation platforms and tools	35%
Performance	34%
Time/effort required to provision capacity for consumers of IT services	33%
Performance of data services	31%
Support for application modernization initiatives, microservices, or container-based applications	30%

Source: Enterprise Strategy Group, a division of TechTarget, Inc.

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[1] Source: Enterprise Strategy Group Research Report, *2023 Technology Spending Intentions Survey*, November 2022.
[2] Source: Enterprise Strategy Group Complete Survey Results: *Navigating the Cloud and AI Revolution: The State of Enterprise Storage and HCI*, February 2024.

The need to deliver the right amount of storage with the right performance profile at the right time for any workload has been hampered by traditional storage hardware. To accommodate increasing performance and capacity requirements, organizations either need to upgrade the controller in order to transition to newer generations of storage media or update software versions to access newer features and capabilities. Performing such upgrades consumes time and effort. Scaling also becomes inefficient, as organizations either need to migrate data to a larger-capacity storage node or stitch together multiple storage nodes, which can lead to performance issues (especially when dealing with east-west traffic). Ultimately, organizations face both unwanted capital costs and, more importantly, operational costs related to provisioning and managing storage silos with multiple performance and capacity profiles to support a diverse set of workloads simultaneously.

Organizations can no longer afford to settle for the status quo when it comes to traditional storage. Instead of scheduling maintenance windows to upgrade storage hardware or software for multiple storage silos, what if organizations could leverage a solution that simplifies storage provisioning and management for a diverse set of workloads while satisfying evolving performance and capacity requirements?

HPE GreenLake for Block Storage Built on HPE Alletra Storage MP

The HPE GreenLake for Block Storage platform is designed to deliver a mission-critical storage service with a disaggregated, software-defined, scale-out block storage system, offered with a 100% data availability guarantee. The storage platform can deliver the scale, resiliency, and performance that are required by mission-critical apps—from large databases to modern cloud-native apps (e.g., AI/ML), to consolidated mixed workloads—to help organizations achieve their business objectives.

To support the daily tasks of storage administrators, DevOps, and cloud administrators, HPE GreenLake for Block Storage provides an intuitive cloud-like experience for provisioning and managing storage. The easy-to-use interface simplifies how end users can configure block storage according to storage performance and capacity requirements or application/workload requirements.

Current State of Legacy Storage Architectures

Legacy storage architectures have not changed significantly over the years. The basic architecture typically consists of a single chassis housing a pair of highly available controllers, connected to dedicated drives via a midplane. The midplane dictates the maximum performance that the system can achieve. To achieve higher performance, organizations typically have two options:

- If the storage media can handle additional workloads without affecting the performance of existing workloads, organizations can switch out the original controller pair with a faster pair.
- If swapping out controller pairs is not sufficient, organizations need to purchase a next-generation storage system offering upgraded controllers.

If opting for the second alternative, however, organizations are left with excess capacity, assuming capacity needs did not increase. (Newer storage system generations typically offer higher performance and storage capacity.) Storage silos emerge that need to be managed and maintained separately, as the hardware and software of each system need to be upgraded independently of each other.

Ensuring that applications can access data at any given time also becomes a headache to manage. Organizations need to map the right servers to the right storage, resulting in more management complexity and, more importantly, inconsistent application performance.

A storage infrastructure consisting of these storage silos, comprised of multiple generations of storage systems, cannot scale flexibly and cost-effectively. The complexity in architecture and management makes it extremely difficult to scale in order to meet evolving performance and capacity demands at any given time. Attempting to do so
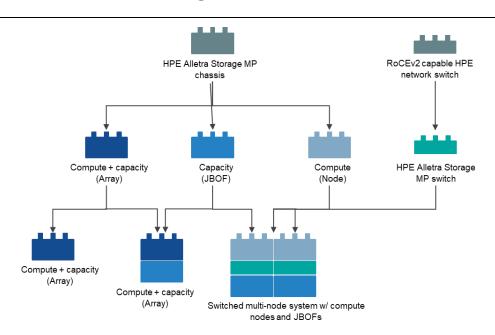
with traditional storage architectures consumes too much time and effort, thus preventing organizations from responding quickly to evolving business needs.

What HPE GreenLake for Block Storage Offers

To address the challenges posed by legacy storage architectures, HPE GreenLake for Block Storage presents a modular, scale-out, disaggregated architecture, as depicted in Figure 2, that organizations can leverage to address evolving performance and capacity needs quickly and efficiently. The basic building block is standardized on a 2 rack unit (2U) box containing two AMD-based I/O modules (IOM). Each IOM is equipped with a single-socket 8-, 16-, or 32-core AMD CPU with variable memory configuration and Trusted Platform Module (TPM) chip for security purposes.

The IOM is a stateless controller that organizations can leverage when configuring storage according to the specific needs of the application or workload. Because the IOM is stateless, organizations can attach any number of units, based on the same hardware and software stack, to create different configurations. Starting with a two-node entry-level configuration, HPE GreenLake can be configured as a standalone storage array, as added capacity for an existing workload (such as just a bunch of flash or JBOF), or as a compute node. To evolve the 2U box into a multi-node system, organizations can add an HPE Ethernet network switch to operate as a storage switch that configures each added unit as either compute or storage capacity. All hardware upgrades are nondisruptive, thus maintaining high availability.

Figure 2. HPE GreenLake for Block Storage

Source: HPE and Enterprise Strategy Group, a division of TechTarget, Inc.

Unlike legacy storage architectures that employ active/standby controllers (i.e., only one controller is processing I/O requests until a switchover occurs), HPE GreenLake for Block Storage employs an all-active design in which all IOMs are continuously processing. I/Os are received and coherently processed by both controllers before being sent directly to the drives. Failover can occur to any resource that is attached to the controller, thus helping to achieve better performance and capacity scaling. (It should be noted that HPE GreenLake for Block Storage has also been equipped with a write-through cache design so that any given I/O is processed by only one controller before being written to a staging area on the drives, eliminating the need to mirror the data to cache on another controller.)

To further simplify operations, HPE GreenLake for Block Storage platform offers data services that enable a cloud-like experience in configuring and managing storage via the Data Services Cloud Console (DSCC) on the HPE GreenLake platform. Using the same standard hardware, organizations can use the platform's data services to simplify storage provisioning from an application's perspective and define storage according to workload requirements (e.g., mission-critical applications, secondary storage, AI/ML), the underlying infrastructure management (e.g., policy management, security/audit services), and storage services needed for resiliency (e.g., backup, recovery, copy data management).

All services are supported by AIOps intelligence to provide end users with recommended actions based on telemetry data collected from HPE systems deployed worldwide. Organizations can minimize the iterative and manual methods for uncovering root causes of service-affecting issues.

The combination of standardized hardware, based on HPE Alletra Storage MP, and the cloud-like provisioning and management experience can deliver the benefits of simplified operations, efficient scaling, and elimination of price-performance compromises.

Enterprise Strategy Group Technical Validation

Enterprise Strategy Group validated how HPE GreenLake for Block Storage enables organizations to simplify how block storage is provisioned and managed by delivering a cloud-like storage management experience.
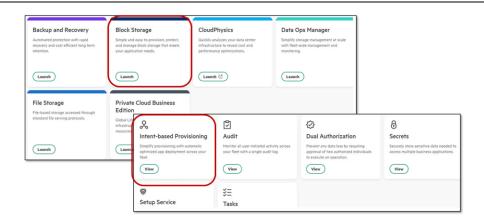
Simplified Storage Provisioning

Organizations are under pressure to meet evolving business needs in less time or else risk losing revenue and customers. This is especially true as DevOps teams are releasing code more frequently and cannot afford to wait for storage to be provisioned by traditional storage administrators. By using the cloud-like management interface, organizations can decrease the time and effort involved in provisioning storage, whether working as a storage, DevOps, or cloud administrator.

Enterprise Strategy Group Testing

Enterprise Strategy Group first navigated to the DSCC dashboard (see Figure 3) on the HPE GreenLake platform. To begin provisioning, we could either click on the **Block Storage** tile or the **Intent-based Provisioning** tile (tailored for application users). Using either option decreases the steps typically followed when provisioning storage compared with traditional methods and tools.
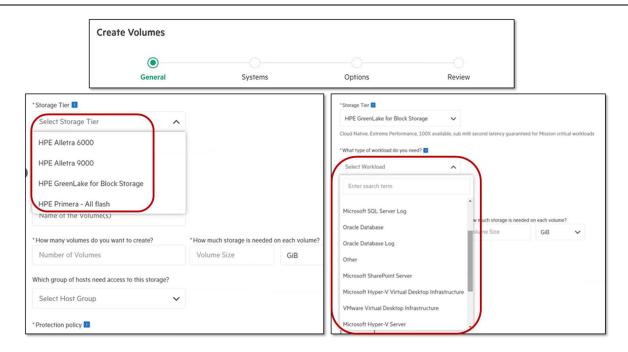
Figure 3. Data Services Cloud Console

Source: Enterprise Strategy Group, a division of TechTarget, Inc.

We clicked on the **Intent-based Provisioning** tile, which navigated us through a wizard-driven process to configure the storage needed for an application. Our first step was to create the storage volumes. We proceeded to select the HPE storage model and server workload type, which includes such options as "Oracle Database" or "Microsoft SQL Server Log" (see Figure 4).
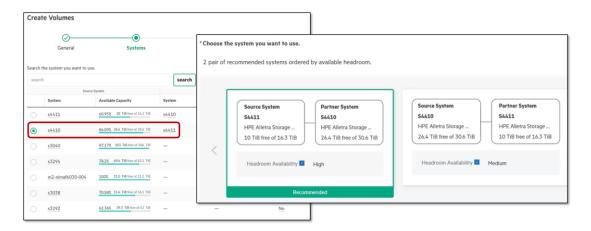
Figure 4. Selecting HPE Storage Model and Workload Type

Source: Enterprise Strategy Group, a division of TechTarget, Inc.

Enterprise Strategy Group proceeded to choose which available system the storage would be provisioned on to support the inputted workload and configure the storage volumes (see Figure 5). We noted that the interface stated the available capacity on the available system options.

Figure 5. Selecting HPE System and Storage Configuration Options

Source: Enterprise Strategy Group, a division of TechTarget, Inc.

Using AIOps-driven intelligence, the DSCC recommended storage options, accounting for performance requirements of the inputted application type and requested capacity. Recommendations were based on telemetry data collected from all HPE-installed systems at customer sites, which reveal the configurations that satisfy the performance requirements required by the desired application. Not only are the performance requirements considered, but the recommended storage options also account for the available performance headroom of the existing storage arrays. As Enterprise Strategy Group could see, provisioning storage on the HPE GreenLake platform was as simple as provisioning public cloud-based storage. This would be especially important for DevOps and cloud administrators who prefer a simple and fast process for provisioning the storage needed.

Why This Matters

As business needs are constantly changing, organizations must deploy the applications and the supporting infrastructure quickly and effectively or risk losing opportunities to achieve positive business outcomes. Provisioning storage is no exception, as organizations must ensure that the supported application meets performance requirements and has the necessary capacity to store the data needed to operate.

Enterprise Strategy Group validated that the DSCC provides the cloud-like experience for provisioning storage according to an application's performance and capacity requirements. We found that the DSCC leveraged the unified and shared architecture of HPE GreenLake and AIOps to configure and deploy storage simply and quickly. Unlike provisioning and configuring storage silos, we found storage provisioning to be greatly simplified, which would help organizations ultimately accelerate time to market while decreasing labor costs.
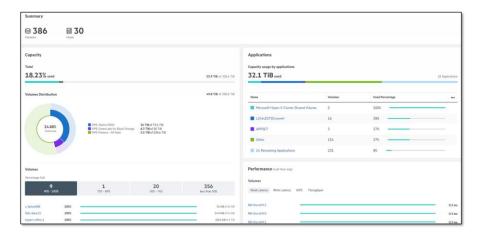
Comprehensive Visibility and Management

Given the unified and "share-everything" architecture of the HPE GreenLake platform, organizations can simplify ongoing storage management and monitoring. The need to use multiple interfaces associated with individual storage model types is eliminated, thus decreasing management and administration costs.
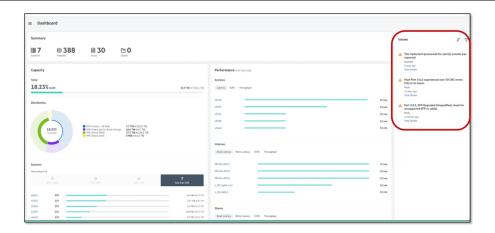
Enterprise Strategy Group Testing

Enterprise Strategy Group navigated to a dashboard tracking the performance of all block storage within an organization's environment. As shown in Figure 6, storage performance was tracked by storage volume and application, and both views could be used to track down issues that were affecting application performance.

Figure 6. Dashboard for Monitoring Relationship Between Applications and Storage Volumes

Source: Enterprise Strategy Group, a division of TechTarget, Inc.

We then navigated to the DataOps Manager to view storage-centric metrics (e.g., available system capacity, storage system performance) and observed how an end user could track ongoing issues affecting application performance (see Figure 7).
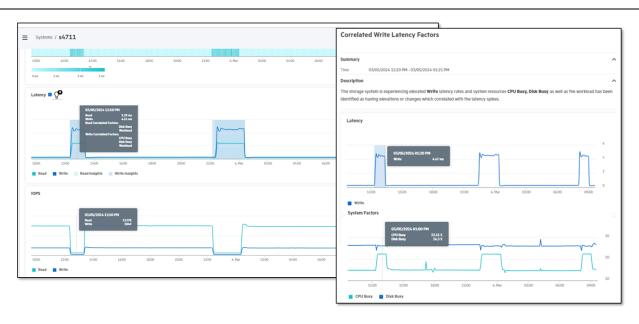
Figure 7. DataOps Manager Interface

Using the DataOps Manager, we noted how an administrator could observe performance over time, locate issues, and then view correlated events to aid in tracking the root case (see Figure 8). Correlated events were identified by the AIOps capabilities. For example, the DataOps Manager revealed that write latency correlated with an increase in CPU and disk utilization. Generating these events could help in decreasing overall mean time to innocence (MTTI) and mean time to repair (MTTR).

Figure 8. Tracking Performance Issues

Why This Matters

Minimizing MTTI and MTTR is critical to ensuring that application performance is optimized. Failing to do so increases the risk that normal business will be disrupted, preventing organizations from meeting their business objectives.

Enterprise Strategy Group validated that the DSCC can help organizations locate issues that are affecting application performance by providing real-time and historical views into both storage consumed and ongoing performance. We also noted how issues could be tracked and monitored across multiple storage systems simultaneously as part of the HPE GreenLake modular and share-everything architecture. To help identify root causes, we saw how AIOps generated correlated events related to a specific issue to help in decreasing both MTTI and MTTR.

Conclusion

As organizations need to deploy storage more quickly to meet faster application release cycles, relying on traditional dual-controller storage systems is not ideal. Organizations have relied on these storage systems to support one or more applications with similar performance and capacity requirements, leading to storage silos. Upgrading storage tends to involve upgrading controllers, which typically involves upgrading to the next release but may also result in acquiring additional, unwanted capacity. Moreover, the processes and workflows for installing, deploying, provisioning, configuring, and managing storage silos are not unified and consistent. The resulting storage environment is too complex for organizations to provision the storage quickly to support any application's performance and capacity requirements. And managing such an environment becomes too labor intensive.

HPE GreenLake for Block Storage is designed to eliminate storage silos by unifying storage into a modular, disaggregated, scale-out, and shared-everything architecture. With HPE GreenLake for Block Storage, organizations use standardized hardware, based on HPE Alletra Storage MP, to build out storage that can support multiple applications with a wide range of performance and capacity requirements. To speed up storage provisioning, HPE GreenLake for Block Storage leverages AIOps, in conjunction with telemetry data from HPE systems deployed worldwide, to recommend storage configurations for any given performance profile and capacity need. By greatly simplifying how storage is deployed and provisioned, organizations can deploy the mission-critical applications to satisfy time-to-market needs.

Throughout our review, Enterprise Strategy Group validated that HPE GreenLake for Block Storage can help organizations simplify storage operations. Specifically, we saw that the combination of the HPE GreenLake for Block Storage architecture and the cloud-like management interface can:

- Simplify how storage is provisioned, as AIOps is leveraged to recommend storage configurations that meet a workload's performance and capacity requirements using simple inputs.

- Provide comprehensive visibility into the unified storage infrastructure from a volume, system, and application perspective, tracking and resolving issues affecting application performance with support from AIOps to narrow down root causes.

Enterprise Strategy Group believes that HPE GreenLake for Block Storage can offer organizations a simpler storage infrastructure that is easier to provision, manage, and monitor so that overall complexity is reduced. More importantly, HPE GreenLake for Block Storage can ultimately help the business better respond to changing business requirements. Should either of these benefits resonate with your organization, we suggest taking a close look at HPE's approach to storage.

About Enterprise Strategy Group
TechTarget's Enterprise Strategy Group provides focused and actionable market intelligence, demand-side research, analyst advisory services, GTM strategy guidance, solution validations, and custom content supporting enterprise technology buying and selling.

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